

IDAHO DEPARTMENT OF FISH AND GAME

**ANNUAL REPORT
ASHTON FISH HATCHERY
1992**

Prepared by:

**Jerry Chapman, Fish Hatchery Superintendent II
Mel Sadecki, Fish Hatchery Superintendent I**

INTRODUCTION

Ashton Hatchery (Figure 1) is located in Fremont County, Idaho, approximately two miles (3.2 km) southwest of the small community of Ashton. Constructed in 1920 and funded by license dollars, Ashton Hatchery serves as a "specialty station" rearing eight species of trout and salmon, including rainbow, cutthroat trout, brook trout, brown trout, golden trout, grayling, kokanee, Kamloops, and Atlantic Salmon.

The majority of fish produced at Ashton are fry and fingerlings (1 to 6 inches) that are distributed throughout Idaho as part of various put-grow-and-take management programs. Catchable-size (9 to 10 inches) trout are also reared at Ashton and distributed locally in waters managed on a put-and-take basis.

FISH PRODUCTION

General Overview

A total of 1,107,740 fish (31,366 pounds) were produced at Ashton Hatchery this year, consisting of 971,373 fingerlings (8,205 pounds) and 136,367 (includes holdovers) catchables (23,161 pounds). The total number of fish produced (Table 1) was down slightly from last year, but the total pounds produced was up. The majority of fish requests were met or exceeded (grayling and golden trout requests were not all met because eggs were unavailable to meet added requests). Production costs (excluding capital outlay) totaled \$138,400.00, with \$10,317.05 spent on fish feed and the remaining \$128,082.95 spent on general hatchery operations and personnel costs. Average cost per pound of fish produced was \$4.41 (Table 1).

All of the fish reared at Ashton were received as eyed eggs from other hatcheries (Table 2). Kokanee were not spawned at Moose Creek in 1992 because of their low numbers in Island Park Reservoir caused by low water levels the past several years. Ashton did not produce enough catchables to meet regional stocking requests, so catchables were shipped in from American Falls and Mackay hatcheries for redistribution by Ashton personnel (Table 3). Extra catchables were received from Ennis National Fish Hatchery and also stocked into area waters.

All fry and fingerlings were fed by automatic belt feeders that dribbled feed into the raceways 8 to 12 hours per day. Human disturbance was thereby minimized, and feed conversions improved by 13% in seven of nine species tested with belt feeders versus the hand feeding technique.

Only catchables were hand-fed, and next year, demand feeders will be used on these fish. Waste-settling areas were created in the back 15% of the smaller outside raceways and served to settle out fish waste for removal before it floated back through the lower fish. Lights over the nursery vats were set at a moderate intensity, and growth rates were maintained when the fish were moved outside by the use of automatic fry feeders and covers on the small raceways.

Golden trout holdovers had the lowest monthly length increase of all species reared, probably because of heavy Gyrodactylus infestation (Table 4), while catchable rainbows had the highest monthly length increase. Holdover brook trout had the poorest conversion rate because of overfeeding a small number of fish, while Kamloops had the best conversion rate.

ASHTON

Average survival for all fish was 76.4% from eyed eggs to planting. Goldens had the lowest survival (60%) because of Gyrodactylus infestation over an extended period, while cutthroats had the highest with 93% (Table 4). Brook trout also had good survival, and grayling survival continued to increase.

Catchable Rainbows

Ashton Hatchery personnel produced 43,883 (18,278 pounds) 10.5-inch rainbow trout for distribution in area lakes and rivers (Table 1). An additional 92,484 (12,736 pounds) 7.4-inch holdover rainbows were produced for stocking in 1993. A total of 22,748 catchables were transferred into Ashton from Mackay and American Falls hatcheries for redistribution to meet regional stocking requests (Table 3).

Water flows were down from a normal flow of 5.5 cfs to 4.5 cfs during the spring months of heavy production. In order to maintain feeding rates for the catchables, supplemental oxygen had to be injected into the water. We used an oxygen box we designed at Ashton and also a Zeigler low head oxygen (LHO) box for this purpose. Both of these boxes mounted behind raceway damboards, and all of the water was channeled through them. Pure oxygen was injected into the boxes and resulting dissolved oxygen levels were raised 1 to 5 ppm, depending on how much oxygen was injected. Oxygen transfer efficiencies over 80% were achieved, and more boxes were purchased for future use.

Golden Trout

Golden trout are being reared at Ashton Hatchery primarily in an attempt to establish an Idaho spawning population at Baker Lake, and also for stocking several mountain lakes. A total of 630, 5-inch fish from the 1991 brood year were planted in Baker Lake in July. These fish had visual signs of Coldwater Disease, but pathologists diagnosed heavy infestations of Gyrodactylus parasites after mortalities increased. A 1:6,000 part formalin bath was administered, and mortalities dropped back to normal within a couple of days and remained low until they could be planted. Gyrodactylus (Gyros) predation has increased at Ashton the last few years, and goldens appear to be very susceptible to predation.

Constant care of these fish was one of the reasons they were so expensive to rear (Table 1). The mean monthly length increase for these fish was .34 inches, while the average conversion was 2.58:1. The poor conversion resulted from overfeeding a relatively small amount of fish.

A total of 864 eyed eggs were received from Daniel Hatchery in Wyoming, and 587 are on hand for stocking in Baker Lake during the summer of 1993. Golden trout are very spooky and difficult to culture, and young fish have a very slow growth rate (.25 inches per month) (Table 1). These fish were treated for Gyros at 2.2-inches and mortalities have remained low since then.

Grayling

Grayling survival continues to improve each year, and this year, survival reached 69% from eyed egg to stocking. Swim-up fry are so small that pantyhose must be placed over the tailscreen to keep them from slipping through. A primitive water level alarm using a car horn, styrofoam float, and a 12-volt battery was used again this year to warn of a plugged tailscreen. As the

pantyhose plugged and raised the water level in the vat, the alarm was activated, alerting personnel of the problem.

The mean monthly length increase was .38 inches, while the conversion was 0.88:1. Kindschi and Barrows (1989) reported that grayling fed BioKyowa during the first 14 days of their test had a survival rate of 81%. Grayling were fed BioKyowa B-250 and B-400 fry feed for the first three weeks at Ashton, then switched to Bio-diet semi-moist starter feed. This diet combination, although expensive, has been very effective in increasing grayling survival at Ashton the last three years, and will be continued again next year.

Colorado River Rainbows

A total of 11,620 eyed eggs were received from native Colorado River rainbows in April, of which 9,781 are still on hand. About 3,000 of these river-run rainbow trout will remain at Ashton to start a broodstock program. The remaining 6,781 fish will be stocked into the Buffalo River in the spring of 1993. All of these fish have been ad-clipped for identification.

Eggs were collected from the South Fork of the Rio Grande River on private ranch property spreading 20 miles from Hot Sulphur Springs to Kremling, Colorado in an area where no supplemental stocking has occurred in the last 20 years. Eggs were taken from females 14-20 inches long (14-15 inch average), while milt was taken from males 11-20 inches long (12-16 inch average). Fish ranged in age from 4 to 7 years, but averaged 4 to 5 years. An approximate 1:1 spawning ratio was attained by spawning 5 females with 5 to 7 males. A total of 30 females were spawned over two egg-takes in early April. Fecundity averaged 800 eggs per female.

These fish have had 8 years of disease workups with no pathogens detected. Catchables are stocked five miles upstream, but biologists feel most of these fish are caught immediately. Whirling Disease has been detected in ponds upstream in the drainage.

HATCHERY IMPROVEMENTS

Utah Power gave Ashton Hatchery \$110,000 for hatchery improvements to rear 22,000 Hayspur rainbow trout for stocking in Ashton Reservoir as mitigation for the Ashton Dam and power plant. A large portion of this money was used to remove the damaged west raceway wall and replace it with a new 8-inch wall and repair the tops of other deteriorating walls. A 6-inch drain line was laid at the base of the wall to drain water from the road to the settling pond, and the wires and irrigation line that were along the wall were repaired or replaced. A concrete pad, using leftover concrete, was built under the stocking tank for easy drive-up loading, and a concrete pad and shed were constructed for the air cleaning blower motor. The blower was then installed and a 2-inch galvanized pipe from the blower to the raceways was buried under the road.

A concrete pad was also poured on the north side of the hatchery building to support a newly purchased 500-gallon liquid oxygen tank. Rigid "k" copper line was installed to deliver oxygen from the tank to every raceway section, and seven new low head oxygen (LHO) boxes were purchased to transfer oxygen into the water via new flow meters and shutoff valves. Waste settling area screens were constructed out of PVC to settle fish waste in the back 15% of the raceway, and aluminum standpipes were purchased to fit in our waste removal lines for easy raceway cleaning. Fish wastes will move to the waste settling area by new air

ASHTON

cleaning lines, and can then be removed periodically by pulling the aluminum standpipes.

Motion lights were installed to scare predators and warn of vandals. The overhead power line near the oxygen tank was buried to meet state safety requirements, and an outdoor outlet was installed behind the hatchery building so we have power to our trailer. Twenty-eight new demand feeder stands were purchased to go with our demand feeders, and a chain link fence was purchased to surround the oxygen tank. A new 386 computer and laser printer was purchased for hatchery record-keeping, and a new hanging scale and sunshade material was purchased to aid with fish culture. An Oxyguard oxygen monitor was purchased to monitor oxygen levels at eight different sites on the hatchery, and has the capability to turn on oxygen into LHO boxes and send an electronic impulse to a telephone dialer to warn of existing oxygen problems.

Additional needs should include repairing the outlet structure, building an extension onto the hatchery building, repairing the entrance road, building a large storage area and heated garage east of the quonset hut, and putting a new metal roof on the 3-car garage. A new fish pump and intake hose should also be purchased.

FISH HEALTH

Department personnel from the Eagle Fish Health Laboratory conducted fish health inspections throughout the year (Table 5). Fish were tested for viral, bacterial, and protozoan pathogens, but none of the 11 pathogens listed in Table 5 were diagnosed. However, 1992 will be remembered by hatchery personnel as the year Gyrodactylus parasites reared their ugly heads. Infestations occurred on goldens, cutthroat, and Hayspur and Colorado River rainbows. Bacterial Gill Disease was also treated in populations of Atlantic salmon, browns, and Colorado River rainbows.

Golden trout were initially thought to have Coldwater Disease, but upon further inspection by Eagle Lab pathologists, heavy infestations of Gyros were diagnosed. A 1:6,000 Formalyn bath treatment for one hour removed the parasites and losses returned to normal. Cutthroat and rainbow trout were also diagnosed as having high Gyro infestations and were effectively treated.

Atlantic salmon started dying of some mysterious cause at 2.5 inches. Almost all of the mortalities were missing at least one eye and were dark colored. Hatchery personnel suspected "pecking," but this behavior was not observed. Several samples were sent to the Eagle Lab, but only low numbers of Acinetobacter bacteria were found. Hatchery personnel then split up the group to test for nitrogen using a packed column in one vat and leaving the other as a control. Mortalities dropped significantly in both groups over the next few weeks, indicating that density was indeed the cause of initial mortalities. Further research has shown that Atlantic salmon need more rearing space than what they were initially given. Mortalities have remained low to nonexistent since they were given more rearing space. A total of 2,934 3.6-inch Atlantic salmon were stocked into Deadwood Reservoir in October, and the remaining 3,700 will be stocked into Deadwood in the spring of 1993.

A 1-hour Chloramine T drip was used to remove gill bacteria from the browns, Atlantic salmon, and rainbows. The Atlantic salmon and Colorado River Rainbows were also fed a 4% Terramycin diet to combat Coldwater Disease.

Ashton personnel recommend that brook trout and kokanee have thorough disease workups in the spring of every year because of their past disease history. If virus, Ich, or Bacterial Kidney Disease are detected in high

ASHTON

concentrations, these fish could be discarded or effectively isolated before much time and money is spent on them. Also, golden and cutthroat trout should be monitored for Gyros periodically, and Atlantic salmon densities should remain low during the 2- to 3.5-inch stage of growth.

FISH STOCKED AND TRANSFERRED

Ashton Hatchery's stocking program remained similar to last year's program, with only a few minor changes. Hayspur rainbow eggs were again received this year, and Ashton will be using this strain for fingerling and catchable requests in the future instead of eggs from Ennis National Fish Hatchery (Table 2). Hayspur strain rainbow trout have been requested for stocking into Ashton Reservoir every year. Black Canyon Trout Farm received the bid for Kamloops eggs and shipped these eggs in November.

A total of 11,000 Colorado River rainbow trout eggs were received, of which 8,000 fingerling will be stocked into the Buffalo River and 3,000 fingerling will be held and eventually spawned for a river-run rainbow trout broodstock program. Fish destined for the Buffalo River have all been ad-clipped for later studies.

Over 12,000 13-inch catchables were received from Ennis National Fish Hatchery for stocking in area waters in addition to catchable requests, and 7,730 6-inch rainbows were received from Ennis and stocked into Ashton Reservoir (Table 3).

FISH SPAWNING

After five consecutive years of dwindling kokanee runs, caused mostly by the drought and subsequent lowering of Island Park Reservoir, no fish were observed in Moose Creek prior to the normal trapping start-up date. Consequently, for the first time in six years, the kokanee fish trap was not operated in Moose Creek. No kokanee eggs were received from Deadwood Reservoir to supplement the Moose Creek egg take as in the past, but eggs were shipped to Cabinet Gorge for rearing and possible release into Island Park Reservoir if future water conditions prove favorable.

A total of 115,905 4-inch kokanee were released into Moose Creek in October, after Island Park Reservoir was detoxified, and should be ready to spawn in three years if reservoir water levels remain high. Spawning activities included helping sort and spawn hybrids, cutthroat, and brook trout at Henrys Lake and helping sort and spawn kokanee at Deadwood Reservoir.

FISH FEED

A total of 35,243 pounds of feed were used to produce 31,366 pounds of gain, for an average conversion of 1.12:1 (Table 6). All fish, with the exception of grayling and Kamloops, were initially fed Bio-Diet because of the size uniformity and performance of the feed. No Rangen's soft-moist feed was used this year. Swim-up grayling were started on Bio-Kyowa B250 and B400 fry feed because of their small size, and then switched to Bio-Diet after several weeks. Catchables and holdover rainbows were switched to a less expensive Rangen's or BioProduct's dry diet when they were 3 inches long, while all other species remained on soft-moist feed until they were planted.

ASHTON

PUBLIC RELATIONS

Approximately 3,000 people visited the hatchery during the year. Over 900 elementary school students from as far as Idaho Falls received hatchery tours last spring, and several tours were given during the summer and fall. Our visitor information display provides information about the hatchery, fishing and hunting regulations, and various Idaho Department of Fish and Game (IDFG) policies. A color-coded pamphlet was designed to show visitors where hatchery fish were stocked and listed reasons for limit changes on the Henrys Fork. The 2-ton fish truck was used in the Ashton Fourth of July parade to represent the hatchery in the community, and a newspaper article about hatchery renovations was written.

Fishing was again allowed in the hatchery settling pond for kids age 12 and under on Free Fishing Day. The Forest Service provided signs and refreshments, and four Forest Service personnel assisted hatchery personnel in showing the kids how to fish. Region 6 (IDFG) fishery personnel provided bait, hooks, bobbers, and fishing poles for the event, and local conservation officers from St. Anthony and Dubois helped teach ethics and laws to the kids. Ralph Moon, world renowned fly fisherman, gave lessons on flyfishing and flytying. Over 200 kids took advantage of the free fishing, and nearly all (99%) of the kids caught a fish. The average fish caught was 2 pounds, with several 5- to 7-pound rainbows taken.

Fishing was also allowed the following weekend for mentally and physically handicapped people. About 40 handicapped fishermen took part in the fishing, and everybody caught a fish. A few 7-pound rainbows were landed, along with a 12.5-pound brown. They cleaned their catch at the hatchery and had a fish fry at the Warm River campground. The happy fishermen were already talking about coming back next year to get "the big one."

FIN CONDITION

Last year, Ashton Hatchery personnel devised a qualitative way to measure hatchery fish fin condition. The technique, "The Ashton Method," compares pectoral and dorsal fin lengths of hatchery fish with those of wild fish to get a percent figure, or fish fin factor. The higher the fin factor, the better the fish fins.

The fin standard for wild fish between 8 and 14 inches taken from the Henrys Fork near Ashton is .13 (.13 inches fin length per inch of fork length) (Figure 3). The projected fin length is the length wild fish fins should be if a fin standard of .13 is used to calculate fin length (Figure 4). For example, a 12.8-inch wild fish should have an average fin length (each fin) of 1.66 inches (12.8 inches x .13). The actual average fin length at each fish length is also shown in Figure 4.

The fin factor at Ashton Hatchery for this year was 66, or hatchery fish fins were 66% of wild fish fins, compared to 69% last year. Measurements of 20 catchables at five different times from different raceways prior to stocking resulted in fin factors of 62, 59, 73, 68, and 69, for an average fin factor of 66. Fin measurements for Ashton fish averaged .0858 inches of fin per inch of fork length, compared to .13 for wild fish ($66\% \times .13 = .0858$). Wild rainbow trout (8 inches to 14 inches) from the Henrys Fork were used for the wild fish fin index, so "the Ashton Method" works best with 8- to 14-inch hatchery rainbows until fin data from other wild fish species can be collected.

SPECIAL PROJECTS

Kamloops Feed Test

A 90-day feed test comparing Rangen's dry feed with Silver Cup feed was conducted. Kamloops trout were split into two vats of similar densities, and one vat of fish were fed Rangen's and the other fed Silver Cup. Water flows were equal, and belt feeders were filled equally and used to eliminate any feeding biases. Mortalities were recorded daily, and final test results are shown in Table 7.

Fish fed Rangen feed displayed a slightly worse conversion than fish fed Silver Cup (.74 versus .70). The total cost for Silver Cup feed for the 3-month test period was 16.6% less than Rangen feed, and the cost per pound of fish produced on Silver Cup was less than on Rangen's (Table 7).

Differences in feed preference for either feed type was not noticed. Pellet uniformity and amounts of dust appeared relatively equal between the two feed brands. Silver Cup feed produced better results in terms of fewer mortalities, greater total weight gain, and better cost effectiveness. Freight cost on the different feed types needed at the hatchery may determine which feed is used for a given time period.

Fish Marking

All Colorado River rainbow trout have had their adipose fin clipped for later identification and research. About 3,000 of these fish will remain at Ashton Hatchery to start a broodstock program for river-run rainbows, and the remaining 6,000 will be stocked into the Buffalo River.

Temiscamie brook trout and cutthroat were not clipped this year, since the Teton cutthroat restocking program has been discontinued and natural and Temiscamie brook trout have been combined into one lot called Henrys Lake brook trout. No other fish were marked or tagged this year.

Broodstock Hauling

Ashton Hatchery personnel were again involved in the mid-winter transport of large rainbow trout broodstock culls from Ennis National Fish Hatchery in Ennis, Montana. Ennis Hatchery is primarily an egg-taking facility, and excess spawners were hauled to lakes and rivers in Idaho. The majority of these fish were between 5 and 10 pounds, and 500 (3,313 pounds) were put into Sheridan Reservoir, while 460 (1,708 pounds) were put into Gem Lake and Robert's gravel pond. Newspaper and radio coverage was very favorable, and several ice fisheries were created. In addition to hatchery catchable requests, Ashton personnel hauled 17,802 (6,675 pounds) catchables from Ennis to lakes in Region 6.

Regional Efforts

Hatchery personnel taught the archery section of Hunters Education classes in Ashton and assisted with firearms training. Personnel also helped with check station and enforcement patrol during elk season. Ashton personnel assisted with Free Fishing Day clinics by stocking fish at Rainbow Lake, Rexburg City Pond, Elk Creek pond, the Mill Ponds, and Willow Creek at McDermott Field in Idaho Falls, and ran the Free Fishing Day clinic at Ashton Hatchery.

ASHTON

ACKNOWLEDGEMENTS

Ashton Hatchery personnel wish to thank Jerry Hugo, John Hanson, and the Forest Service personnel for their help on Free Fishing Day.

LITERATURE CITED

Kindschi, Greg A. and Frederick T. Barrows. 1989. Diets for the Intensive Production of Montana Arctic Grayling. U.S. Fish and Wildlife Service, Bozeman Fish Technology Center, Bozeman.

Table 1. Fish production and costs.

Species	Size	No. fish	Weight	Cost/lb	Cost/fish	Total
fingerlings produced and stocked						
R9	2.3	116,12	548	\$16.42	\$0.07	\$8,996
K1	2.5	124,58	765	11.76	0.07	8,996
BN	2.5	119,82	684	16.19	0.09	11,072
BK	3.3	198,34	2,638	5.61	0.07	14,808
KE	3.1	329,45	3,466	5.98	0.06	20,760
C3	2.2	33,040	134	20.66	0.08	2,768
RC	1.2	3,700	8	53.23	0.11	415
GR	0.7	27,910	5	461.00	0.07	2,076
GN	4.8	630	25	27.46	1.10	692
AS	3.6	2,934	41	34.00	0.47	1,384
Totals/ average		956,555	8,313 *	\$8.66	\$0.075	\$71,967
holdover fingerlings						
R10	2.8	9,781	78	17.74	0.14	
AS	4.8	3,763	141	14.72	0.55	2,076
GN	2.3	587	2.4	115.33	0.47	278
BK	5.1	687	32	12.98	0.60	415
Totals/ average		14,818	229	\$18.14	\$0.28	\$4,153
catchables produced and stocked						
RA	10.5	43,883	18,278 **	1.66	0.69	
				2.92***		
catchables produced for 1993						
R9	7.4	92,484	12,736	2.49	0.34	
* Pounds stocked, 7,976 lbs actual gain in 1992. ** Pounds stocked, 10,425 lbs actually produced in 1992. *** Actual cost on 10,425 lbs produced in 1992.						

ASHTBLS

Table 2. Eggs and fish received and transferred during 1992.

<u>Species</u>	<u>Eggs received</u>	<u>Fish received</u>	<u>Fish transferred</u>	<u>Destination</u>
GR	40,000		5,572 19,159 1,500	Clark Fork McCall Mackay
C3	35,500			
BK	146,429			
AS	12,672			
BN	328,492			
R9	363,257			
K3	130,092			
GN	864			
RC	5,000		3,700	McCall
GN			630	Hayspur
RA		4,312		
R1		12,728		
R5		21,431		
R9		4,375		
R10	11,620			
Totals	1,073,926	42,846	30,561	

Table 3. Origin of fish stocked or transferred, 1992.

Species	Source	Eggs	Fish	Destination	Stocked	Trans- ferred	Size (in)
R1	Ennis NFH		12,728	Region6	12,728		12.9
R5	Ennis NFH		7,370	Region6	7,370		6.3
R5	Mackay		14,061	Region6	14,061		11.8
R9	American Falls		4,375	Region6	4,375		9.3
RA	Mackay		4,312	Region6	4,312		11.7
BK	Henrys Lake	215,900 *		Henrys Lake	198,347		3.3
BK	Henrys Lake		100,000 ⁿ	Henrys Lake	100,000		0.8
AS	Wizard Falls	11,532 *		Deadwood	2,934		3.6
GR	Daniels, WY	40,000		Statewide	1,679	26,231	0.7
C3	Henrys Lake	35,500		Blue Creek	33,040		2.2
GN	Sylvan Lake	1,057 ***		Hayspur		630	4.8
R9	Hayspur	306,329 **		Region 6	116,126		2.3
KE	Deadwood	408,366 *		Region 6	329,457		3.1
RA	holdovers	60,523		Region 6	43,883		10.6
BN	Saratoga	147,914 *		Region 6	119,824		2.5
K1	Gloyd Springs	155,040 *		Region 6	124,587		2.5
RC	Henrys Lake	5,000		McCall		3,700	1.2
Total stocked or transferred					1,112,723	30,561	

* Received prior to 1992.

** Received prior to 1992 and an additional 92,400 still on hand.

*** Received prior to 1992 and an additional 400 still on hand.

Table 4. Comparative growth rates, feed conversion and percent survival for all species reared at Ashton Hatchery, 1992.

Species	Average monthly length increase	Average conversion	Percent survival
rainbow (catch.)	0.56	1.33	73
rainbow (finq.)	0.34	0.85	68
golden	0.34	2.92	60
brook	0.33	0.87	92
brown	0.31	0.90	81
Kamloops	0.43	0.68	80
grayling	0.38	0.88	69
kokanee	0.32	0.83	81
cutthroat	0.27	0.72	93
rc hybrid	0.55	1.20	74
Atlantics	0.32	1.36	68
Holdovers			
rainbow	0.53	1.06	
Atlantics	0.35	1.08	
goldens	0.25	4.50	
Colorado River rainbow	0.30	1.53	
brook	0.38	0.75	

Table 5. Pathology test results, Ashton Hatchery, 1992.

Species/ strain	Date (90)	VH	VP	VE	BK	BF	BR	BC	PX	PW	PC	PI
Brook trout	3-17	-	-									
Atlantic salmon	3-17	-	-									
Kokanee	3-17	-	-			-	-	-				
Goldens	3-17	-	-			-	-	-				
Atlantic salmon	7-20					-	-	-				
Atlantic salmon	8-17	-	-			-	-					
Brook trout	8-17					-	-					
CO Riv. rainbow	8-17											
Atlantic salmon	9-30											
HL cutthroat	10-30											
Atlantic salmon	10-30											

VH = IHNV, Infectious Hematopoietic Necrosis virus VP = IPNV, Infectious Pancreatic Necrosis virus
VE = EIBS, Erythrocytic Inclusion Body Syndrome virus
BK = Bacterial Kidney Disease agent, Renibacterium salmoninarum
BR = Enteric Redmouth Bacterium, Yersinia ruckeri
BC = Bacterial Coldwater Disease, Cytophaga psychrophila or Flexibacter BF = Bacterial Furunculosis, Aeromonas salmonicida PW = Whirling Disease agent, Myxobolus (Myxosoma) cerebralis PX = PKX, agent of PKD, Proliferative Kidney Disease PC = Ceratomyxa shasta, agent of Ceratomyxosis PI = Infestation by Ichthyophthirius multifiliis

+ = Positive results
- = Negative results

Table 6. Feed use.

Size	Source	Pounds	Cost/lb	Total Cost
#1 moist	Bio-Products	308	.863	265.80
#2 moist	Bio-Products	572	.863	493.80
#3 moist	Bio-Products	880	.863	759.44
1.0 moist	Bio-Products	572	.705	403.26
1.3 moist	Bio-Products	880	.641	564.08
1.5 moist	Bio-Products	2,860	.659	1,884.74
2.5 moist	Bio-Products	308	.590	181.72
3.0 moist	Bio-Products	132	.590	77.88
1.0 dry	Bio-Products	350	.400	140.00
1.3 dry	Bio-Products	500	.358	179.11
1.5 dry	Bio-Products	1,500	.371	557.60
2.5 dry	Bio-Products	1,300	.340	442.00
1.0 medic.	Bio-Products	44	.970	42.68
1.3 medic.	Bio-Products	264	.958	253.11
1.5 medic.	Bio-Products	44	.970	42.68
#1 dry	Rangens	50	.440	22.00
#2 dry	Rangens	50	.440	22.00
#3 dry	Rangens	100	.440	44.00
#4 dry	Rangens	100	.285	28.50
3/32 dry	Rangens	2,327	.235	505.25
1/8 dry	Rangens	4,000	.235	940.00
5/32 dry	Rangens	20,000	.235	2,350.00
#1 dry	Silver-Cup	50	.374	18.70
#2 dry	Silver-Cup	50	.374	18.70
B-250	Bio-Kyowa	1.1	36.36	40.00
B-400	Bio-Kyowa	1.1	36.36	40.00
TOTALS		37,243.2 *		\$12,798.49

* 2,000 lbs 5/32 fed to catchables transferred in.
35,243 lbs feed used on fish produced.

ASHTBLS

Table 7. Kamloops feed test results.

	Rangen (Lot #3-A)	Silver Cup (Lot #4-A)
Initial fish numbers	58,802	67,407
Ending fish numbers	57,508	67,079
Total mortalities	1,294	328
Initial wt. (lbs)	61.0	61.0
Ending wt. (lbs)	376.0	389.0
Weight gain (lbs)	315.0	328.0
Initial length (in)	1.17	1.17
Ending length (in)	2.65	2.55
Length gain (in)	1.48	1.38
Total feed fed (lbs)	232.0	231.0
Total feed cost (\$)	109.18	90.63
Cost per pound (\$)	.346	.276
Ending feed conversion	0.737	0.704
Ending Fish/pound	153	172
Ending cond. factor	3.5×10^{-4}	3.5×10^{-4}

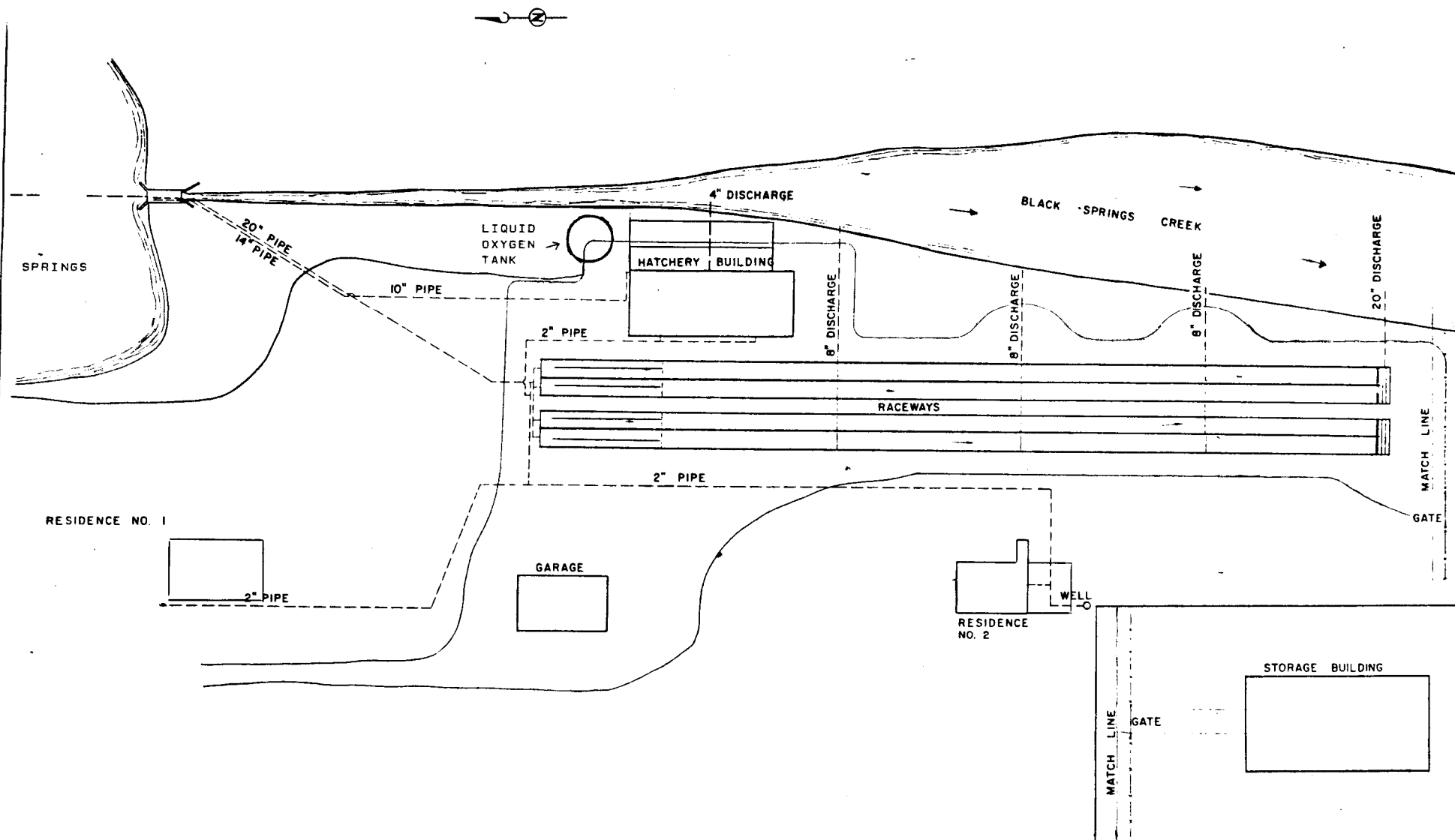


Figure 1. Ashton Fish Hatchery.

ASHTON HATCHERY

Budget Distribution 1992 Ashton Hatchery

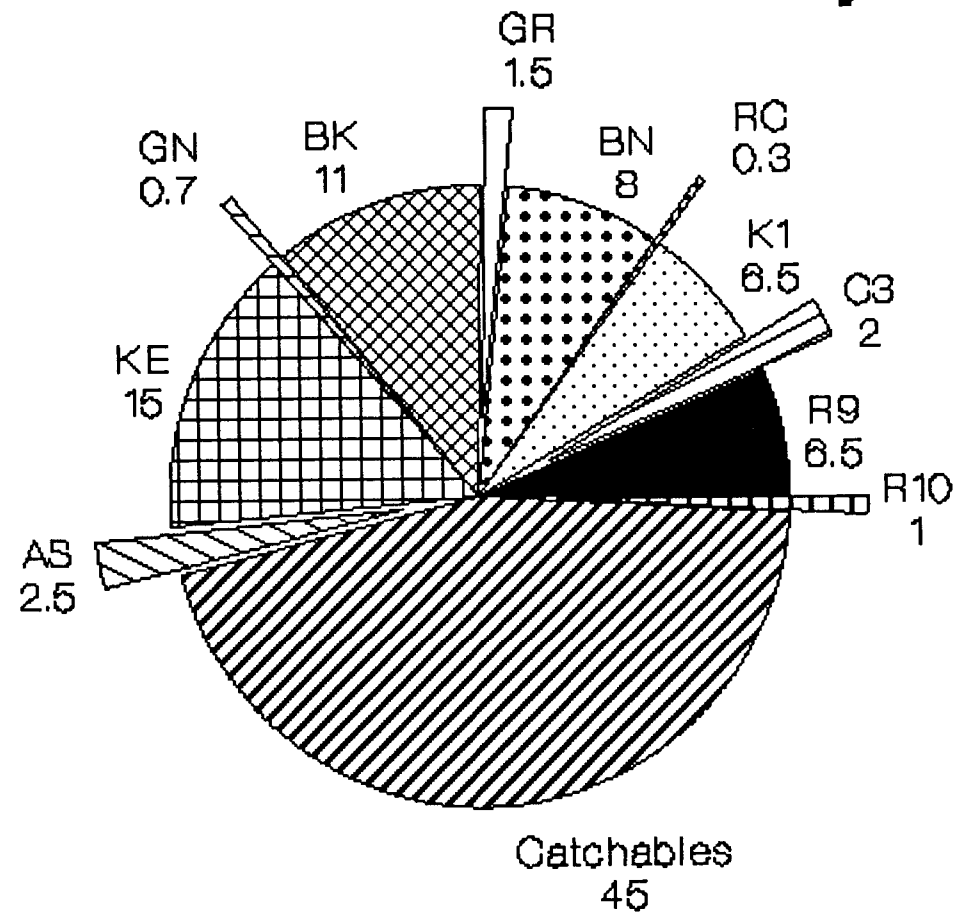


Figure 2. Percent of Total Budget.

Fin Standards of Wild Fish

Henrys Fork April 30, 1991

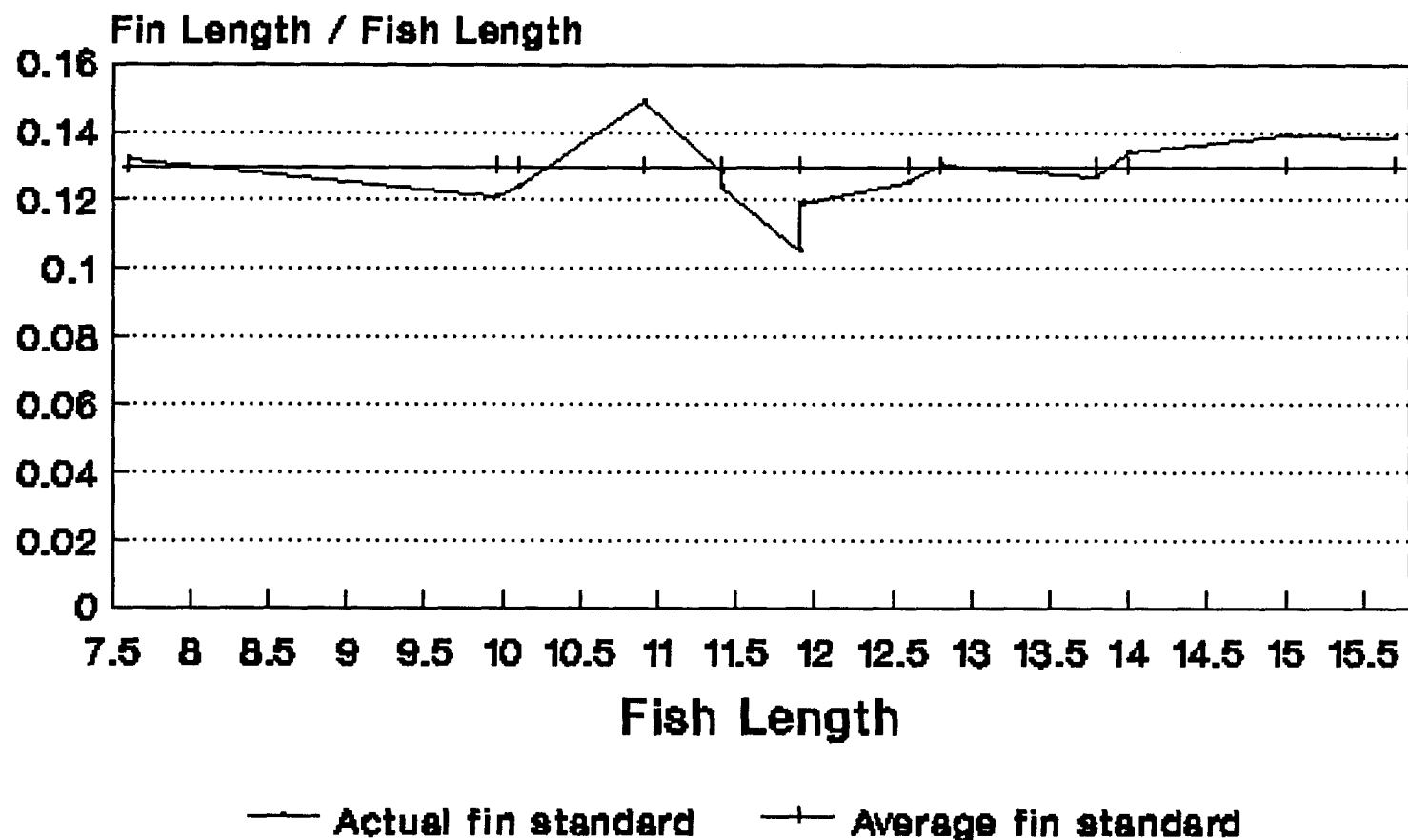


Figure 3. Fin standards of wild fish.

Average vs. Projected Fin Lengths - Wild Fish April 30, 1991 - Henrys Fork

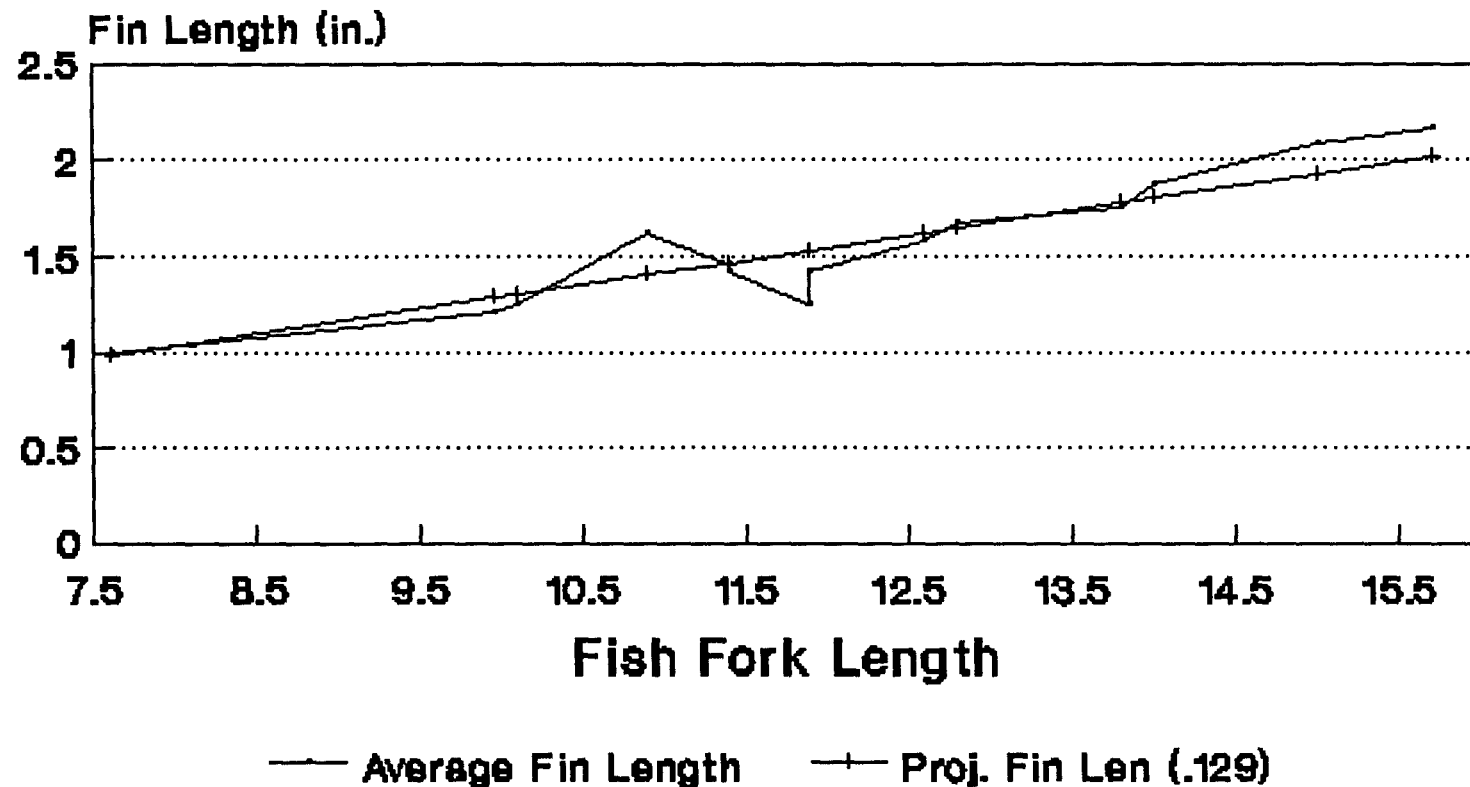


Figure 4. Fin Lengths of Wild Fish.